Patent Claims

1.
A method for controlling temperature in a boil-off gas in a liquefaction plant prior to compression, wherein boil-off gas originating from an LNG storage tank is compressed and at least partially condensed, and wherein said condensed boil-off gas (LNG) is being returned to the storage tank, said method being
characterized by:
heat exchanging boil-off gas with said LNG, wherein the boil-off gas temperature is lowered and said LNG fully evaporated; and controllably mixing said fully evaporated LNG with said boil-off gas.

2.
The method of claim 1, characterized by
mixing said fully evaporated LNG with said boil-off gas upstream of said heat exchange.

3.
The method of claim 1, characterized by
mixing said fully evaporated LNG with said boil-off gas during said compression.

4.
The method of claim 1, characterized by
mixing said fully evaporated LNG with said boil-off gas following said compression.

5.
The method of claim 1, characterized by:
maintaining a continous flow of LNG and boil-off gas in said heat exchange, whereby the LNG temperature is substantially constant.

6.
The method of claim 1, characterized by:
controlling (25, 60) the mixing rate based on comparing the temperature of the boil-off gas downstream of said heat exchange, with a predetermined temperature or range of temperatures.

7.

An apparatus for controlling temperature in a boil-off gas in a liquefaction plant prior to compression, wherein boil-off gas from an LNG storage tank is fed via a feed line into at least one compressor (10) and where the compressed gas is further fed into a heat exchanger (30) for at least partial condensation, and where said condensed boil-off gas (LNG) is being returned to the storage tank via a return line, said apparatus being

c h a r a c t e r i z e d b y

- a combined mist separator and heat exhanger (20) connected to the the boil-off gas feed line, between the LNG storage tank and the compressor (10);
- a first conduit (22) fluidly connecting the line for returning LNG to the storage tank and the combined mist separator and heat exchanger (20);
- a second conduit (26; 26'; 26") fluidly connecting the combined mist separator and heat exchanger (20) to the boil-off gas feed line;
- said first (22) and second (26; 26'; 26") conduits being fluidly connected via a cooler (24) in said combined mist separator and heat exchanger (20), and
- wherein the boil-off gas is heat exchanged against said cooler (24) prior to being fed into said compressor (10).

8.

The apparatus of claim 7, c h a r a c t e r i z e d b y said second conduit (26) fluidly connecting the combined mist separator and heat exchanger (20) to the boil-off gas feed line upstream of said combined mist separator and heat exchanger (20).

9.

The apparatus of claim 7, c h a r a c t e r i z e d b y said second conduit (26') fluidly connecting the combined mist separator and heat exchanger (20) to the boil-off gas feed line after the first compression stage of said compressor (10).

10.

The apparatus of claim 7, c h a r a c t e r i z e d b y said second conduit (26") fluidly connecting the combined mist separator and heat exchanger (20) to the boil-off gas feed line downstream of said compressor (10).

11.

The apparatus of claim 7, c h a r a c t e r i z e d b y a control valve (25) in said first conduit (22), for controlling the LNG flow rate into the combined mist separator and heat exchanger (20).

12.

The apparatus of claims 7 and 11, c h a r a c t e r i z e d b y a control unit (60) connected to the control valve (25) and the boil-off gas feed line downstream of the combined mist separator and heat exchanger (20) and upstream of said compressor (10), a control unit (61) connected to the control valve (25) and the boil-off gas feed line upstream of the cold box (30) and down stream of said compressor (10) whereby the LNG flow rate into the combined mist separator and heat exchanger (20) is controllable based on the sensed temperatures of the boil-off gas in the feed line downstream said combined mist separator and heat exchanger (20) and downstream said compressor (10).

13.

The apparatus of claim 7, c h a r a c t e r i z e d i n t h a t the combined mist separator and heat exchanger (20) additionally comprises a boil-off gas inlet (27), a chamber (29) and a drain (92) upstream of said cooler (24), and a mesh screen (28) between said heat exchanger (24) and an outlet (91), whereby boil-off gas is cooled by heat exchange with the cooler (24).